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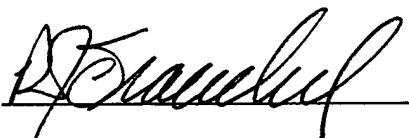
J-SEAD FOR THE SECOND MTW

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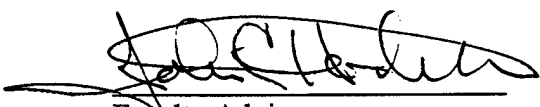
A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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8 February 2000


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3 Feb 2000
Date

DISTRIBUTION STATEMENT A
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PRIC QUALITY INSPECTED 4

1. Report Security Classification: UNCLASSIFIED			
2. Security Classification Authority:			
3. Declassification/Downgrading Schedule:			
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT			
6. Office Symbol: NWC Code 1C		7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207	
8. Title (Include Security Classification): J-SEAD For The Second MTW (U)			
9. Personal Authors: Richard J. Fraenkel, LCDR USN			
10. Type of Report: FINAL		11. Date of Report: 8 February 2000	
12. Page Count: 27		<i>Advisor: Prof. Modell</i>	
13. Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.			
14. Ten key words that relate to your paper: SEAD, J-SEAD, IADS, JTTP, UAV, IO, HARM, ATACMS, JFAAC, MTW			
15. Abstract: The JFC assigned to fight and win a second MTW will be faced with a monumental task. He must neutralize the enemy's sophisticated integrated air defenses, keep casualties and collateral damage to a minimum, and do it with limited resources, specifically overcoming an acute shortage of dedicated SEAD assets. To meet this challenge, the JFC and his staff must fully employ J-SEAD doctrine and apply all available joint forces to achieve his objectives. This paper addresses a wide variety of options for J-SEAD which would be available to second MTW commanders, including increased reliance on traditional SEAD assets, non-traditional SEAD assets supplied by joint and/or coalition forces, and even perhaps new war-fighting methods like IO or UAVs. However, the commanders must be aware of the risks and costs associated with these alternatives, and as always, carefully weigh them relative to the overall operational/ strategic objectives.			
16. Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users
17. Abstract Security Classification: UNCLASSIFIED			
18. Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19. Telephone: 841-6461		20. Office Symbol: NWC Code 1C	

ABSTRACT

The Joint Force Commander (JFC) assigned to fight and win a second major theater war (MTW) will be faced with a monumental task. He must neutralize the enemy's sophisticated integrated air defenses, keep casualties and collateral damage to a minimum, and do it with limited resources, specifically overcoming an acute shortage of dedicated suppression of enemy air defense (SEAD) assets.

To meet this challenge, the JFC and his staff must fully employ joint suppression of enemy air defense (J-SEAD) doctrine and apply all available joint forces to achieve his objectives. This paper addresses a wide variety of options for J-SEAD which would be available to second MTW commanders, including increased reliance on traditional SEAD assets, non-traditional SEAD assets supplied by joint and/or coalition forces, and even perhaps new war-fighting methods like information operations (IO) or unmanned air vehicles (UAVs). However, the commanders must be aware of the risks and costs associated with these alternatives, and as always, carefully weigh them relative to the overall operational/strategic objectives.

The U.S. will someday become involved in a major theater war (MTW). When that happens, U.S. forces will likely face a sophisticated integrated air defense system, their public will expect minimum casualties, and their political leaders will demand a minimum level of collateral damage. In addition to these daunting challenges, both the President's recently published A National Security Strategy for a New Century and the Chairman of the Joint Chiefs of Staff's National Military Strategy of the United States demand that U.S. forces be prepared to fight and win two MTWs.¹

Obviously, the Joint Force Commander (JFC) assigned to fight and win the second MTW is faced with a monumental task. If he intends to use the American advantage in air power, he must somehow neutralize the enemy's integrated air defenses, keep casualties and collateral damage to a minimum (which may be interpreted as some value close to, if not, zero), and do it with limited resources.

In order to meet this challenge, the JFC and his staff must fully master the art of joint warfighting. For the commander, a framework is in place that calls for the joint suppression of enemy air defenses (J-SEAD) in order to enable effective U.S. and coalition air force operations in support of the National Command Authorities' (NCA's) objectives. Only through the application of all available, as opposed to only "traditional," assets can joint forces achieve J-SEAD objectives which in turn will enable the JFC to meet his overall air campaign objectives while still meeting the demands of minimum casualties and minimum collateral damage.

BACKGROUND

We begin the 21st century with a general sense of peace, or at least the absence of major war, with only Operations *Desert Storm* in Iraq and *Allied Force* in Kosovo as the notable exceptions in the last decade. Since the fall of the Berlin Wall in November of 1989 there has been no peer competitor in the military sense, nor does one appear to be on the near horizon. Because of these two conditions, peace and no peer competitor, the American people and their national political leadership has felt and continues to feel the need to draw down defense spending. The implication to the JFC is that, for the foreseeable future, there will be no significant increase in either quantitative numbers of, or qualitative improvements to U.S. armed forces. In other words, tomorrow's MTW(s) will be fought with today's forces.

Furthermore, when American air forces have fought in the 1990s over Iraq and over the former Yugoslavia, they have totally dominated the skies. There are two consequences from this domination of the air that need to be considered. First, one must assume that potential adversaries recognize our strengths and will attempt to develop the means to defeat our air forces. Second, the American public has come to expect the overwhelming success of U.S. air operations at very low cost in terms of U.S. lives.

In my opinion, there are two fundamental ways for a potential adversary to develop the means to defeat our air forces. First, they could create a superior air force by acquiring third and fourth generation fighter aircraft to counter our most advanced aircraft. I believe this option is not one we will likely face because it involves substantial investments in aircraft, infrastructure, and training. The second option would be to create a superior surface to air capability. This option is more likely due to its inherently lower cost. While the most sophisticated Russian radar-guided surface to air missile (SAM) systems are quite expensive

and will probably not be widely exported because of their cost, there does appear to have been a significant proliferation of lower end, yet still lethal, Russian radar guided SAMs that cost less in terms of hardware and training.² It is this threat, a robust, multi-layered, integrated air defense system, that the JFC will likely face.

The second consequence of America's total domination of the skies comes from the complete lack of friendly casualties due to hostile fire during Operation *Desert Fox*, Operation *Allied Force*, and the continuing strikes against Iraq from both Operation *Southern Watch* and *Northern Watch* forces. These operations have set a standard for future air operations, further reinforcing what has become an American public perception that U.S. air forces are essentially invulnerable. This invulnerability has, in turn, led to the perception by military commanders, both U.S. and potentially belligerent ones, that the U.S. public is overly sensitive to American casualties.

So, the United States is at peace, has no peer competitor, and its politicians want to cash in on the peace dividend through lower U.S. defense budgets. Meanwhile, U.S. air operations have been overwhelmingly successful, setting expectations of invulnerability and creating a climate of casualty aversion. It is important to note that these observations are perceptions, and regardless of the public's perception, the world still contains very real threats to America's national security. The President's National Security Strategy clearly acknowledges this reality.³ But perceptions have a way of creating their own reality. For the JFC, these observations imply that when called to do so he will have to fight with limited resources against an opponent who will attack and defend asymmetrically, and who will likely attempt to take advantage of the American public's, and perhaps even the JFC's, aversion to casualties.

More specifically, future air operations will likely be opposed by increasingly sophisticated air defenses, including layered surface-to-air missile defenses, high density anti-aircraft artillery (AAA) and, if available, by fourth generation combat aircraft, all networked and directed through an integrated air defense system (IADS). This IADS would not only serve the tactical purpose of defending against hostile aircraft; it may also serve an operational or strategic purpose. When faced with U.S. air operations, the objective of the IADS commander may not necessarily be to thwart any individual air strike, but rather to shoot down an American aircraft and either kill or capture the pilot(s). From both the operational or strategic perspective, this would be a valid course of action, since getting the image of a dead or captured American pilot in front of the CNN cameras might strike directly at a strategic American center of gravity - the will of the people.

Doctrine.

To counter this threat, the JFC, and if designated, the Joint Force Air Component Commander (JFACC) and their staffs will need to develop a plan to effectively neutralize the enemy's IADS. This operational concept is called Joint Suppression of Enemy Air Defenses, or J-SEAD.

The efficacy of SEAD has been recognized since the beginnings of combat air operations.⁴ An outstanding argument for effective SEAD was presented by Richard M. Atchison in 1987, when he graphically demonstrated the relationship between aircraft attrition rates, total sorties flown, and the duration of combat operations in days. His analysis

“shows the results of theoretical attrition rates over a 30 day period on a force of 1000 aircraft flying 2 sorties per day. A 1% attrition rate will result in 45,150 sorties with 557 aircraft remaining at the end of 30 days. However, a

10% attrition rate will yield only 8,320 total sorties with only 2 aircraft remaining at the end of 30 days."⁵

In today's post-Cold War security environment, even a one percent attrition rate leading to the loss of nearly half of the assigned aircraft in a 30 day period appears unacceptable. Clearly, if faced with a threat capable of inflicting a 10% attrition rate on friendly aircraft, no air commander would attempt operating within such a threat's lethal engagement envelope without a highly effective and dedicated SEAD effort.

The primary U.S. doctrinal publication for the conduct of J-SEAD is Joint Publication 3-01.4, JTTP for Joint Suppression of Enemy Air Defenses (J-SEAD). Within this publication, the Joint Staff has defined SEAD as "any activity that neutralizes, destroys, or temporarily degrades enemy surface based air defenses by destructive and/or disruptive means."⁶ The JTTP of J-SEAD further amplifies the definition by stating that the purpose of SEAD is "to increase aircraft survivability."⁷ J-SEAD is then defined as "all SEAD activity provided by components of a joint force in support of one another."⁸ At the operational level of war, J-SEAD is further subdivided to include Area of Responsibility (AOR)/Joint Operations Area (JOA) air defense system suppression, localized suppression, and opportune suppression.⁹ While the specific planning and coordination responsibilities differ within each category of J-SEAD operation, for this paper it is only necessary to recognize that J-SEAD operational doctrine covers the full spectrum of combat, from local tactical engagements to theater-wide operational/strategic campaigns.

But what is J-SEAD really? I consider the basic concept of J-SEAD to be the creation of a sanctuary from which joint air forces can effectively and safely operate. Within the J-

SEAD sanctuary, U.S. air forces are protected from the enemy's air defense weapons, and can effectively strike their assigned targets. While the IADS commander's objective is to deny our access to his airspace, it is J-SEAD's objective to neutralize, disrupt or destroy the IADS or elements of the IADS, in order to ensure access to our targets.

The J-SEAD sanctuary must be created within a volume of air space and over a specified time frame. The size and duration of the sanctuary will vary depending on what the specific objectives are. The JFC may desire the sanctuary to cover the entire JOA, or simply the creation of a corridor to and from the target area. The sanctuary may have to be permanent, or it may only need to be transitory. I also consider J-SEAD to be an enabling operation, designed to create a favorable environment within which U.S. forces operate. As such, the J-SEAD operational plan must reflect, and be dependent on, the JFC's overall objectives.¹⁰ For example, if the JFC's objectives include air supremacy, then the opposing air defense system must be reduced to such a degree that it no longer threatens U.S. forces at any time. For this case, the J-SEAD objective would be to create a sanctuary over the entire JOA for the duration of combat operations. If only air superiority is required, then the opposing force must be reduced only at a given time and place such that U.S. air forces may conduct operations without undue risk from the air defense system. In this case the J-SEAD objective would also be less ambitious, perhaps creating the sanctuary over only the immediate geographic flying area and only during those times when joint forces are flying. Whatever the scope of the J-SEAD objective, the sanctuary can be created through destructive and/or disruptive means, and optimally through a synergistic combination of both destructive and disruptive means.¹¹

Destructive means include the physical destruction of SAMs, AAA, radars, command

and control (C2) nodes and communications nodes. These effects are achieved using "bombs, air and surface-to-surface missiles, air scatterable mines, and artillery."¹²

Disruptive means increase aircraft survivability by temporarily denying, degrading, deceiving, delaying or neutralizing enemy air defense systems. Joint doctrine splits disruptive means into two categories, active and passive. Active disruptive means include electronic attack,¹³ expendables,¹⁴ and tactics.¹⁵ Emissions control, camouflage, warning receivers, and material design comprise passive disruptive means.¹⁶

The sanctuary could also be created through an effective operational deception plan. Through deception, the JFC may be able to create a perception or condition within the enemy's command echelon that reduces the readiness level of the enemy's IADS to some level below optimum for combat. For example, if the enemy commander is convinced that he is not threatened by U.S. air assets in a particular region, or at a particular time, he may elect to keep his mobile SAM elements in garrison rather than deploy them. In this way, the operational deception plan may create an effective sanctuary in time by extending the IADS' reaction to some value greater than friendly force exposure.

J-SEAD asset limitations.

From an Air Force perspective, with its understandable focus on air operations, Operation *Allied Force* was clearly an MTW and it seriously strained the SEAD resources of U.S. air forces.¹⁷ Initially, the air planners focused on destroying strategic level air defenses by targeting critical nodes within the Serbian IADS with cruise missiles. Fixed air defense sites were then destroyed with manned strike aircraft using precision guided bombs. The remainder of the J-SEAD mission then focused on Serbian mobile radars and SAMs. It was

at this juncture, because of insufficient J-SEAD assets, that *Allied Force* planners and operators resorted to alternative plans. Since Serbian radar and SAM operators responded to U.S. dominance in the SEAD domain by not radiating, the threat from unsuppressed and unlocated mobile SAMs forced *Allied Force* strike aircraft to avoid the threat by operating in a high-altitude sanctuary. When J-SEAD assets were not available, air planners limited the number of strikes rather than fly without the electronic protection.¹⁸

Even as the lessons learned from the *Allied Force* air campaign continue to be collected, the media has clearly identified that even for this single MTW, electronic warfare, and specifically the dedicated SEAD platforms, were stretched to their limits. Aviation Week & Space Technology reported that "the Kosovo air campaign shows that the U.S. didn't have enough radar jamming aircraft to support the desired pace of operations."¹⁹ Air Force Magazine reported that commanders felt that there were sufficient F-16CJs, but not enough personnel and pods for the high pace of combat operations.²⁰ On 22 April 1999, the San Diego Union-Tribune reported that "all EA-6B Prowler radar-jamming planes are now in Italy, except those that are deployed on ships, in final workups for deployment or are being used for training new crews." In the same article, Admiral Reason, the Atlantic Fleet commander, speaking specifically about the shortage of Prowlers, was quoted as saying, "If we have another flare-up in the world, then we're short."²¹

Clearly, one of the take-aways from Operation *Allied Force* would be that U.S. air forces can operate effectively in the face of a sophisticated IADS, but that to do so requires a significant portion of the available dedicated SEAD assets.

Implications for the second MTW.

It is apparent that the first MTW will draw the majority of the U.S. armed forces' dedicated SEAD assets. However, this fact will not diminish the requirement for the second MTW's JFC to effectively neutralizing the enemy's IADS. Conducting air operations without the desired number of EA-6Bs and F-16CJs will come at a price for the American war fighter. Regardless of the planning option or options pursued by the JFC and his staff to mitigate the shortage of these assets, there will be risks. The question that must be wrestled with is at what point does the risk become unacceptable?

Manned flight operations over hostile territory without optimum SEAD coverage will certainly increase the probability of, and the numbers of, American casualties and prisoners of war (POWs). In my opinion, the risks associated with collateral damage may also increase, due to the pilots' increased attention on survival versus target identification and weapons guidance, and due to the increased use of destructive ordnance versus disruptive jamming. While the joint commander already calculates the risks associated with any operation, limitations in SEAD assets will force the commander to carefully weigh any additional risks associated with air operations versus his perception of the "value of the object."

If the risk is high enough, the joint commander will likely be forced to request approval for individual missions from higher authority. Recognizing the near instantaneous command and control available for the National Command Authorities (NCA), the JFC must be prepared to request mission approval from the NCA, particularly for missions where the probability of American casualties, POWs, or collateral damage is near certain, regardless of the "value of the object." He must also be prepared to accept mission disapproval, and plan

for the consequences of that denial on his assigned objectives.

With a less-than-optimal SEAD plan, a fully developed response must be prepared for the eventuality of American casualties or POWs, including Information Operations and Public Affairs. While these requirements exist regardless of the level of risk American warriors are exposed to, the higher the risk level, the more critical will be the task of effectively handling the inevitable press interest. The JFC must be prepared to answer hard, probing questions about his forces' readiness levels and their "adequacy" in relation to the threat. As warriors, we may understand that combat does not wait for us to be ready, and that there are limits to American combat power, particularly evident in a two MTW scenario. However, the American public and the world press will assuredly not understand this reality without careful tutelage from American combat leaders.

For the second MTW, the commander and his staff must be prepared to adequately suppress or neutralize an enemy's IADS without a full toolbox of dedicated SEAD assets. While this is obviously a challenging proposition, it is not insurmountable. By carefully assessing the availability and capabilities of traditional SEAD assets, non-traditional SEAD assets brought to the fight by U.S. services or coalition partners, "new" war-fighting techniques, or perhaps by adjusting the operational level employment of J-SEAD, the J-SEAD planners should be able to adequately accomplish their mission, thereby enabling the success of the overall operational/strategic effort.

OPTIONS FOR THE JFC.

While the press reports from Operation *Allied Force* may appear to doom the JFC tasked with conducting air operations in a second MTW, there are several viable options

available to joint forces that can be employed to achieve the required J-SEAD effects. These options are necessarily highly scenario dependent, but they do provide the J-SEAD planner with some alternatives.

Increase reliance on available traditional SEAD assets.

We have seen that stand-off precision strike weapons can be used as J-SEAD weapons. By choosing to use these weapons to destroy critical targets within the enemy's IADS early in the campaign, the commander may be able to build an effective sanctuary within which his air forces can effectively operate. The JFC and his staff will have to make some very hard choices with these weapons, and should use the joint targeting coordination board (JTCCB) with proper guidance from the commander and perhaps even from the NCA. What the commander and the JTCCB must decide is the relative value of the classic target set for these weapons versus SEAD targets, while considering the total number of stand-off weapons available to the commander, the viability of delaying the destruction of the previously assigned targets, and the collateral damage risks associated with matching these stand-off precision weapons with SEAD targets. If successful, the sanctuary created by the stand-off weapons should allow the air forces to service the deferred target set with non-stand-off weapons (LGB, dumb bombs, cluster munitions, etc.). There is a risk that if the stand-off weapons do not succeed in creating a sanctuary permanent enough to allow the follow-on strike missions, then not only does the IADS continue to pose a threat, but there is an opportunity cost relative to the targets that could have been destroyed by the already expended stand-off weapons. In addition to lengthening the duration of the campaign, this choice may also challenge the operational targeting process, since some targets within an

opposing IADS' structure (mobile radars, mobile communications receivers) may not routinely be located to the precision required by stand-off weapons.

Another set of traditional SEAD assets that can be relied upon more heavily include self-defense systems like chaff, DECM, RWR, and towed decoys. Increased reliance on these self-defense resources will also come at a price to joint forces. First, by increasing the expenditure rates on limited resource like chaff and towed decoys, the demand on the joint logistics system would increase. Second, the effectiveness of DECM and RWR equipment is highly dependent on the currency of the loaded software. To function properly, these systems must be able to correctly identify potentially threatening enemy emissions, and as such are dependent on a valid target parameter list for the actual enemy emissions and are vulnerable to wartime reserve modes²² and to enemy modifications to their equipment on the battlefield. Additionally, since DECM equipment produces an active jamming waveform in response to enemy emissions, these jamming signals are subject to analysis by the enemy, and in time, may be countered. The JFC's electronic warfare staff must establish and maintain a link with the appropriate national EW laboratories responsible for reprogramming these self-defense EW systems, and ensure that a process is in place to effectively react to enemy responses.

HARM missiles are another J-SEAD asset that can be relied upon more heavily when other dedicated J-SEAD platforms are not available. Preemptively launching anti-radiation missiles,²³ regardless of the launch platforms, can effectively create a time sanctuary for joint air forces operating within the lethal envelope of enemy SAM systems by offering the SAM operators the choice of either shutting down their radar(s), or risk having them destroyed. Either way, the sanctuary is created while the anti-radiation missile threat is present. In my opinion, an effective J-SEAD plan with the full array of dedicated SEAD assets will employ

HARM preemptively only for the minimum necessary time period. Relatively quickly, within no more than two to three days, HARM employment will become purely reactive, used exclusively in response to observed threat emissions. However, without dedicated SEAD assets directing the reactive use of these weapons, their utilization rate will continue to be high due to the continued use of the missile in a preemptive mode. The commander must recognize that long-term preemptive HARM use will not only result in an increased demand on the joint logistics system, but it will also increase the risk of collateral damage from HARMs launched without active threat emitters to track on. While the HARM will accomplish its mission of either destroying the threatening radar or dissuading the threat radar operator from energizing his system, the launched HARM will land somewhere. A significant level of effort must be focused at both the operational level and the tactical level in order to mitigate this risk of collateral damage. The methods for doing so exceed the classification and the scope of this paper, however the operational planner must be aware that this risk can be, and must be, minimized.

Decoys have been effectively used for SEAD missions by the Israelis in 1982 in the Bekaa Valley²⁴ and were used extensively in the early days of Operation Desert Storm.²⁵ Their utilization could be increased in order to improve the effectiveness of anti-radiation missiles particularly in the early phase of the J-SEAD effort. This option would also increase the demands on the joint logistics systems by increasing the utilization rate of decoys, and it would increase the overall length of the air operation since decoys tend to be launched by strike aircraft that would otherwise be destroying assigned targets.

Look to other services or coalition partners for non-traditional SEAD assets.

A quick survey of Jane's All The World's Aircraft reveal that there are at least three other nations who possess aircraft capable of fulfilling the stand-off radar jammer role. The Russian Air Force has at least four different platforms capable of this mission, including a number of Tu-22MP (NATO BACKFIRE) EW/escort jammer aircraft,²⁶ over one hundred Su-24MP (NATO FENCER F) EW/jamming/SIGINT aircraft,²⁷ the Mi-8SMV (NATO HIP-J) and Mi-17P (NATO HIP-H).²⁸ While Jane's does not provide total numbers of radar jamming helicopters in the Russian inventory, they simply note that the Mi-17P is "exported throughout the world."²⁹ The Ukrainian air forces have twelve Su-24MP aircraft.³⁰ The French have a pod system called the Caiman radar jammer that is mounted on tactical aircraft for "jamming surveillance and target designation radars."³¹

The J-SEAD planner can also look to allies and coalition partners for HARM shooters, as when German Air Force Luftwaffe Tornado aircraft were used by NATO commanders during Operation *Allied Force* to provide over 400 SEAD sorties.³² While other nations can be a lucrative source of J-SEAD assets, they do not come to the fight without some penalties. In addition to the standard command and control issues that routinely plague multi-national air operations, J-SEAD planners will need to overcome significant classification hurdles to involve these forces into a historically very closely held, and highly classified, mission.

U.S. forces bring some non-traditional assets to the J-SEAD mission also. For example, the B-52 bomber may have some capability in a stand-off jamming mode. This option appears to have been explored for Operation *Allied Force*, since the CINC "requested that a version of the ... B-52 bomber, a so-called EB-52 equipped with offensive electronic

warfare gear, be quickly developed ... for use against Serbia's [IADS]."³³ I believe that the primary obstacles to this alternative would be the lack of operational testing and training in this mission area.

The U.S. Army might also provide significant J-SEAD alternatives to the commander. A promising destructive J-SEAD weapon the U.S. Army deploys as a Corps artillery asset is the Army Tactical Missile System (ATACMS). A GPS guided surface-to-surface rocket system capable of effective ranges beyond three hundred kilometers, this weapon is a viable tool for the J-SEAD planner.³⁴ ATACMS were used as a J-SEAD weapon during Operation *Desert Storm*, silencing an Iraqi air defense site within "minutes" of the request for fire support from an A-10 flight.³⁵ In order to effectively employ ATACMS in a J-SEAD role the JTCB, if established by the JFC, must factor this weapon into its process and consider ATACMS as a potential SEAD weapon. JTTP for J-SEAD clearly identifies the requirement for close coordination with the Land Component Commander for the use of ATACMS, and also highlights the importance of component liaison elements within the JFACC for "providing the means to request surface fire support."³⁶ In addition to long range fires from ATACMS, the Army can also support the J-SEAD effort with armed helicopters, as it did at the start of Operation *Desert Storm*, when 22 minutes prior to H-hour on 17 January 1991, Army "helicopters attacked early warning radar sites in southern Iraq."³⁷

In the Close Air Support (CAS) environment, the Army's Multiple Launch Rocket System (MLRS), with an effective range beyond thirty kilometers³⁸ would certainly be effective at suppressing tactical SAMs and AAA. In my opinion, the primary challenge for the utilization of MLRS in a J-SEAD role would be the need to communicate the immediate threat to the pilot(s) from the air control C2 network to the fire support C2 network in a

timely manner, but training and effective coordination should overcome this hurdle.

Sequential SEAD instead of concurrent SEAD.

Both Operations *Desert Storm* and *Allied Force* were planned and executed as concurrent SEAD efforts. In other words, these air offensives were conducted such that non-SEAD targets were assigned to strike assets while the initial SEAD efforts were creating the sanctuary for those strike assets. In a second MTW, with insufficient dedicated SEAD assets assigned, the JFC may choose to plan for sequential SEAD instead, whereby the enemy IADS is targeted and destroyed with all available fires before non-SEAD targets are assigned. In terms of operational art, the commander could apply the principal of economy of effort and choose to sequence the destruction of the enemy's IADS before the joint air forces' main effort. This option would obviously lengthen the duration of the campaign or operation, and deny strategic and operational surprise from the main effort, but it would decrease the overall risk to the joint air forces.

"New" war-fighting techniques.

Information Operations (IO) should have some ability to create at least a portion of the desired sanctuary normally achieved through standard SEAD operations. Of note, having been published in 1995, JTTP for J-SEAD does not list IO as a means for suppressing enemy IADS, other than acknowledging that "joint air operations may require support ... from resources other than aircraft."³⁹ Information operations should be able to achieve some level of degradation to threat "integrated" air defenses by attacking the networked aspect of the IADS. While it seems unlikely that IO would be able to destroy or degrade individual SAM

systems, it should be able to assist in the integrated attack on the enemy IADS as a whole. In a recent Reuters report, the in-coming vice chairman of the Joint Chiefs of Staff, Air Force General Richard Myers, while answering questions concerning the use of IO noted that U.S. forces "had mounted electronic attacks into the Serbian [air defense] networks" during Operation *Allied Force*, implying that this capability has seen operational use. General Myers neatly summarized this option by saying, "If you can degrade an air defense network of an adversary through manipulating ones and zeros, that might be a very elegant way to do it as opposed to dropping 2,000-pound bombs on radars."⁴⁰ From an operational art perspective, IO might be a powerful tool for focusing the massing of effects by enabling a synergistic application of destructive and disruptive means throughout the operational depth of the threat IADS. In my opinion, the primary limitation to this alternative is the highly classified and compartmentalized nature of the capability, which has limited the capability's exposure from the vast majority of war-fighters, making it difficult to plan for its use.

Unmanned Air Vehicles (UAVs) are another source of non-traditional J-SEAD capability. The JFC's electronic warfare staff must become thoroughly familiar with the capabilities and limitations of these assets. While this class of weapon system continues to mature rapidly, it is difficult to provide a comprehensive list of actual SEAD functions they have already performed, but it is apparent that UAVs will have a significant role to play in J-SEAD. At a minimum, J-SEAD planners must ensure that UAVs are tasked to identify and locate SEAD targets, to provide indications and warning of impending enemy air defense activities, and to provide damage assessments following destructive SEAD missions. Also, planners should determine whether the UAVs actually deployed have other classified capabilities which might have previously unrecognized implications to the conduct of the

J-SEAD mission.

CONCLUSION AND RECOMMENDATIONS.

Since the options presented above carry risks and consequences with their use, J-SEAD planners must remain flexible, and should develop sequels and branches to their plans, depending on whether the chosen alternatives prove to be fruitful. Clearly, the demand on the joint logistics system, regardless of option(s) chosen, will increase, not only due to increased use of less efficient weapons to conduct the SEAD mission, but also due to the likelihood that the overall campaign/operation will last longer.

Many of the options listed above have risks that can be mitigated through operational testing and training, while others simply require that operational staffs establish effective command and coordination links between the tactical warfighter and the operational planner. Other options, notably the U.S. Army assets and potential allied or coalition forces, would benefit from training with U.S. air forces, even if their training were not with the specific forces they would support in combat.

The JFC of a second MTW will face a tremendous challenge when he is faced with a sophisticated IADS, limited traditional J-SEAD resources, and an environment of casualty and collateral damage aversion. However, there are options beyond the standard J-SEAD solution that can effectively meet this challenge, particularly if, as the JTTP for J-SEAD acknowledges,⁴¹ they are synergistically combined with traditional J-SEAD suppression measures. It is through the application of all available J-SEAD measures in accordance with the JTTP for J-SEAD framework that the JFC can achieve his overall objectives.

NOTES

¹ U.S. President, A National Security Strategy for a New Century, (The White House: December 1999), 19, available online at <<http://www.whitehouse.gov/WH/EOP/NSC/html/documents/nssr-1299.pdf>>; and Joint Chiefs of Staff, National Military Strategy of the United States of America, (Washington: 1997), 15.

² With limited (and cheap) engineering investments, potential adversaries could modify existing weapon systems to defeat known U.S. capabilities, creating unique indigenous capabilities. While details of this potential course of action would necessarily be classified and beyond the scope of this paper, operational planners must account for the eventuality that an adversary will have modified his equipment.

³ U.S. President, 1-3, 14-20.

⁴ See William A. Hewitt, Planting the Seeds of SEAD: The Wild Weasel in Vietnam, (Air University Press, Maxwell Air Force Base, Alabama, 1993) for a discussion on the early development of the SEAD mission.

⁵ Richard M. Atchison, "Electronic Combat: Threat, Doctrine, Technology," Journal of Electronic Defense, (April 1987), 63.

⁶ Joint Chiefs of Staff, JTTP for Joint Suppression of Enemy Air Defenses (J-SEAD), Joint Pub 3-01.4, (Washington: July 1995), v.

⁷ JTTP for J-SEAD, I-6.

⁸ JTTP for J-SEAD, v.

⁹ JTTP for J-SEAD, III-1.

¹⁰ JTTP for J-SEAD, III-4.

¹¹ JTTP for J-SEAD, I-5.

¹² JTTP for J-SEAD, I-6.

¹³ Electronic attack includes anti-radiation missiles, radar jamming, and communications jamming.

¹⁴ Expendables include the whole range of chaff, flares, and decoys, including towed decoys.

¹⁵ By tactics, doctrine includes avoidance (flying around or over the lethal envelope of located threat SAMs and flying at night to avoid optical AAA and SAMs), and deception.

¹⁶ JTTP for J-SEAD, I-6.

¹⁷ John A. Tirpak, "Dealing With Air Defenses," Air Force Magazine (Air Force Association, November 1999), 25, available online: LEXIS/NEXIS Academic Universe (17 December 1999).

¹⁸ Tirpak, 25.

¹⁹ Bruce D. Nordwall, "Analysts Looking For A Replacement," Aviation Week & Space Technology (McGraw-Hill Companies, Inc., 6 December 1999), 67, available online: LEXIS/NEXIS Academic Universe (17 December 1999).

²⁰ Tirpak, 25.

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- ²¹ James W. Crawley, "Conflict Impacts Navy, Marine Exercises," San Diego Union-Tribune (San Diego Union-Tribune, 22 April 1999), A-17, available online: LEXIS/NEXIS Academic Universe (17 December 1999).
- ²² In this context, wartime reserve modes, also known as WARM, are operating characteristics of threat emitters such as SAM radars or IADS data links that are held in reserve for combat operations. These modes are seldom, if ever, intercepted or identified prior to conflict. Given the U.S. dependence on computerized parametric lists for threat detection and identification, previously unknown or unanticipated WARM capabilities could have significant implications for aircraft survivability.
- ²³ That is, shooting at previously located threat radars without first detecting, identifying and locating a specific threat radar.
- ²⁴ Bruce J. Gebhard, Putting the "J" in J-SEAD, monograph (U.S. Army Command and General Staff College, Fort Leavenworth, Kansas: 1994), 40, DTIC, ADA288707.
- ²⁵ Department of Defense, Conduct of the Persian Gulf War, Final Report to Congress (Washington: April 1992), T-197.
- ²⁶ Paul Jackson, ed., Jane's All The World's Aircraft, 1998-1999 Edition (Surrey, UK: Jane's Information Group Limited, 1998), 441.
- ²⁷ Jackson, ed., 418.
- ²⁸ Jackson, ed., 392-395.
- ²⁹ Jackson, ed., 395.
- ³⁰ Jackson, ed., 418.
- ³¹ Martin Streetly, ed., Jane's Radar and Electronic Warfare Systems, 1999-2000 Edition (Surrey, UK: Jane's Information Group Limited, 1999), 483.
- ³² "Luftwaffe counts up SEAD sorties," International Defense Review, (Surrey, UK: Jane's Information Group Limited, September 1, 1999), available online: LEXIS/NEXIS Academic Universe (17 December 1999).
- ³³ "Military Requested Electronic Warfare B-52 For ALLIED FORCE," Armed Forces Newswire Service, (Phillips Business Information, Inc., 1 December 1999), available online: LEXIS/NEXIS Academic Universe (17 December 1999).
- ³⁴ Christopher F. Foss, ed., Jane's Armour and Artillery, 1999-2000 Edition (Surrey, UK: Jane's Information Group Limited, 1999), 816.
- ³⁵ Conduct of the Persian Gulf War, Final Report to Congress, T-149.
- ³⁶ JTTP for J-SEAD, III-7,8.
- ³⁷ Conduct of the Persian Gulf War, Final Report to Congress, 118.
- ³⁸ Conduct of the Persian Gulf War, Final Report to Congress, T-148.
- ³⁹ JTTP for J-SEAD, I-6.

⁴⁰ "U.S. Plots Cyberwarfare Strategy," Reuters, (London, Reuters Limited, 5 January 2000), available online: <<http://dailynews.yahoo.com/headlines>> (5 January 2000). It is worth noting that Bill Gertz, reporting for the Washington Times, covered the same press conference and reported only that General Myers said the Pentagon had considered IO and had "worked through some policy and legal issues." Bill Gertz, "U.S. Set To Take Warfare On-Line." Washington Times, (Washington, News World Communications, 6 January 2000), available online: <<http://ebird.dtic.mil/Jan2000/e200000106usset.htm>> (7 January 2000).

⁴¹ JTTP for J-SEAD, I-6.

ABBREVIATIONS

AAA	Anti-Aircraft Artillery
AOR	Area of Responsibility
ATACMS	Army Tactical Missile System
C2	Command and Control
CAS	Close Air Support
CINC	Commander in Chief
CNN	Cable News Network
DECM	Defensive Electronic Counter Measures
EW	Electronic Warfare
GPS	Global Positioning System
HARM	High-speed Anti-Radiation Missile
HTS	HARM Targeting System
IADS	Integrated Air Defense System
IO	Information Operations
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JOR	Joint Operations Area
J-SEAD	Joint Suppression of Enemy Air Defenses
JTCB	Joint Targeting Coordination Board
JTTP	Joint Tactics, Techniques, and Procedures
LGB	Laser Guided Bomb
MLRS	Multiple Launch Rocket System
MTW	Major Theater War
NATO	North Atlantic Treaty Organization
NCA	National Command Authorities
POW	Prisoner Of War
RWR	Radar Warning Receiver
SAM	Surface-to-Air Missile
SEAD	Suppression of Enemy Air Defenses
SIGINT	Signals Intelligence
UAV	Unmanned Air Vehicles
WARM	War Reserve Mode

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